Environmental Education and Educational Achievement:

PROMISING PROGRAMS AND RESOURCES

National Education and Environment Partnership

A project of the The National Environmental Education and Training Foundation

Washington, DC

October 2002



The National Environmental Education & Training Foundation

The National Environmental Education & Training Foundation (NEETF), chartered by Congress in 1990, fulfills a unique role in the environmental education (EE) and training field. The Foundation fosters environmental learning at the national level and provides a voice for learning-oriented solutions to environmental problems. It is a forum for unique, unusual, and effective working relationships that focus on the environment. These include partnerships between government, business, citizen groups and individuals. As part of its Congressional charter, the Foundation, a private, non-profit organization, also has a formal partnership with the U.S. Environmental Protection Agency to support scientifically sound and effective development of non-regulatory voluntary programs for environmental stewardship.

The National Education & Environment Partnership

The National Education & Environment Partnership's purpose is to help mainstream environmental education by fostering connections among formal, informal and environmental education policymakers and organizations. It believes that environmental education can lead to improved academic achievement for students, better teaching, and stronger stewardship attitudes and skills. To this end, it is issuing a series of publications that explain EE to other fields and that introduce EE practitioners to funding and other advancement opportunities, as well as holding workshops and other events to bring the worlds of EE, formal and informal education closer together. The Partnership is a project of NEETF with major support from the U.S. EPA Office of Environmental Education. For more information and links, please go to www.neetf.org/education/index.shtm.

NEEP Steering Committee

American Association of Museums

Environmental Council of the States

Environmental Education & Training Partnership

National Environmental Education & Training Foundation

State Education and Environment Roundtable

U.S. Environmental Protection Agency, Office of Environmental Education

ACKNOWLEDGEMENTS

NEETF gratefully acknowledges two talented interns who did the bulk of the work on this report: Cristy Lytal and Marian Norris. Other NEETF staff who worked on the project include Andy Finch and Deborah Sliter. Bora Simmons of the Environmental Education and Training Partnership and Kathleen MacKinnon of the U.S. Environmental Protection Agency's Office of Environmental Protection provided valuable advice and feedback.

The report was made possible by the generous support of the U.S. Environmental Protection Agency's Office of Environmental Education through cooperative agreement No. 82871301.

Cover illustration: Randy Lyhus

Environmental Education and Educational Achievement:

PROMISING PROGRAMS AND RESOURCES

National Education and Environment Partnership

A project of the The National Environmental Education and Training Foundation

Washington, DC

October 2002

TABLE OF CONTENTS

INTRODUCTION 4

ENVIRONMENTAL EDUCATION AND EDUCATIONAL ACHIEVEMENT 5

TEN PROMISING PROGRAMS

- The Heritage Project, Woodlake, CA 6
- King Middle School (Portland, ME) and Expeditionary Learning Outward Bound, Garrison, NY 7
- School of Environmental Studies, Apple Valley, MN 8
- Gililland Elementary School, Fort Worth, TX 9
- San Diego Natural History Museum, San Diego, CA 10
- Huntingdon Area Middle School, Huntingdon, PA 11
- Dowdell Middle Magnet School, Tampa, FL 12
- Four Corners School of Outdoor Education, Monticello, UT 13
- Eagle Rock School, Estes Park, CO 14
- Skykomish High School, Skykomish, WA 15

RESOURCES "AT A GLANCE"

- National Programs 17
- Environmental Education Organizations and Projects 18
- Bibliography 19
- Web Resources 20

INTRODUCTION

This report is intended as an introductory guide for those new to the environmental education field and the larger educational benefits it has to offer. The first part of the report includes ten accounts of programs and schools that have met with success by incorporating environmental education into their educational programming. For readers whose interest is piqued by these stories of success and who would like to learn more, a listing of contacts and resources is set out in the second, "at a glance," part of the report.

The ten case accounts illustrate particularly promising strategies and practices for integrating environmental education (EE) into educational settings. The stories include EE programs that incorporate elements of service-learning, comprehensive school reform, after-school, project-based learning, science integrated across the curriculum, and arts education.

These ten programs are harbingers of change, of a new era for our schools and for our children.

Many of the schools described have been transformed by their commitment to EE, with positive impacts ranging from improved discipline to greater parental involvement to greater success in meeting standards.

Although the U.S. Department of Education does not have a specific environmental education program or office, many of its programs, such as those for after-school and service-learning, are natural fits with EE programming. Each of these cases describes a program that has either received such Departmental funding or has been supported by another related source such as the Corporation for National and Community Service. That is because environmental education programming can successfully incorporate elements of multiple academic strategies that deliver solid results on standardized tests and report cards.

Part II, the listing of resources, provides a "glance" into the increasingly complex field of environmental education (EE). We have included a handful of entries in each of four general categories related to EE: national programs, organizations and projects, the academic benefits of EE, and other resources.

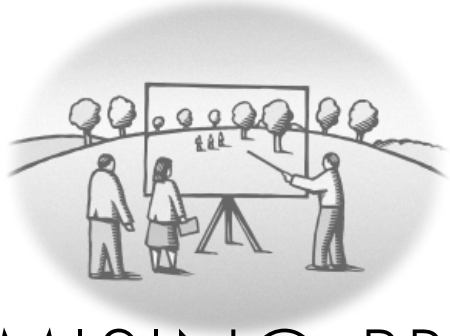
We hope that these exemplary programs and resources will provide inspiration and guidance for anyone with an interest in EE and it relationship to the current issues in formal education. For further information and resources, please feel free to contact Andrew Finch, NEETF's Senior Director of Education & the Environment Programs, at finch@neetf.org, or go to www.neetf.org

ENVIRONMENTAL EDUCATION AND EDUCATIONAL ACHIEVEMENT

Many people think of environmental education as "nature studies" – a supplement to the educational system that relates only tangentially to the core curriculum. In actuality, EE refers to educational efforts that increase public awareness and knowledge about environmental issues while providing critical thinking, problem-solving, and effective decision-making skills. The main goal of EE is for people of all ages to know enough about environmental science and related social issues to make sound and well-reasoned environmental decisions. In this publication, we are focusing on EE programs, organizations, and projects related to K-12 students and educators as well as presenting information on how EE relates to academic achievement, school improvement, and other current issues in formal education.

Professionally-executed EE is a comprehensive process for helping people understand the environment, their place in it, and related issues (Archie and McCrea 1998). EE emphasizes the interdisciplinary integration of subject matter, hands-on learning experiences, and team teaching. Because it centers on problem-solving and decision-making, it fosters so-called constructivist approaches to education, in which children work on real problems in context rather than abstract problems out of context. It fosters both independent and cooperative learning, creating independent thinkers who can work together to solve common problems. The State Education and Environment Roundtable (SEER) (www.seer.org) has developed a school improvement model, Environment as an Integrating Context (EIC), that uses schools' natural and community surroundings as a venue for connecting these pedagogies to improve teaching and learning. Many people refer to this kind of education as "environment-based education" in recognition of its primary emphasis on academics. (Please note that NEETF recently released a report on EE and school improvement models focusing on the U.S. Department of Education's Comprehensive School Reform Demonstration grants program. The report can be downloaded from NEETF's website at www.neetf.org.)

A broader adoption of EE in the nation's schools can help produce motivated students, high-performance life-long learners, effective future workers and problem solvers, thoughtful community leaders, and people who care about the people, creatures, and places that surround them. As a proven method of achieving academic excellence, environmental education has been adopted as an effective tool for meeting and exceeding state and local educational standards, many of which specifically include EE. A set of national standards for EE, developed by the North American Association for Environmental Education (NAAEE), including both materials (http://naaee.org/npeee/materials.html) and learning guidelines (http://naaee.org/npeee/learner_guidelines.html), has also been developed.



TEN PROMISING PROGRAMS

The Heritage Project

1

A 21st CENTURY COMMUNITY LEARNING CENTER

It may be a small local wetland, a modest schoolyard habitat or even two incredible national parks, but the use of outdoor study sites and programs gives richness and relevance to other school subjects. In addition to having good access to land and natural resources, environmental education also offers support from expert staff from parks, forests, refuges, museums, zoos and nature centers. They can help teachers provide a higher quality educational experience for young people. Consider the experience of the Heritage Project in California.

In a rural community where 85% of students qualify for free or reduced-price lunch, the Heritage Project provides 2,500 K-12 students with enriching and exciting after-school activities, courses, and celebrations. Through a partnership between three school districts and Sequoia and Kings Canyon National Parks, an exceptional environmental education program has evolved to complement the Heritage Project's other academic and cultural offerings.

Teachers and administrators at the Heritage Project recognize Sequoia and Kings Canyon as invaluable resources for teaching and inspiring their students. Once a week, students meet with a park ranger in order to learn about topics related to the Parks, such as cycles of forest fires and the adaptations of local animals to their habitats. In order to bring these lessons to life, students frequently visit the Parks for hands-on experience. Importantly, the connection these students have with the Parks is more extensive and regular than the occasional field trip that many schools offer.

The Heritage Project features many other environmental education classes and activities, many of which combine recreation and exercise with learning. For example, students learn about river ecology while rafting, kayaking, and hiking around the local lake. The horseback riding program incorporates lessons on how to care for horses in their environment. Other hands-on environmental education courses have involved arts in nature, weed eradication, and zoology. In these and many other courses, students learn to understand the world around them while developing skills for environmental decision-making and citizenship.

Educators at the Heritage Project have found that hands-on experiences, such as a real wolf visiting from Montana, have inspired greater student motivation to learn. The program has yielded many successes:

- Nearly three-quarters of local students have become involved in the Heritage Project.

- Since its inception, test scores in both language and math have improved.
- The incidence of behavioral problems in the classroom has decreased, suggesting that the Heritage Project has endowed its participants with better social skills.
- Increasing numbers of parents are becoming involved in the school, and the Heritage Project plans on further encouraging this trend through a new community education center.

The Heritage Project
300 West Whitney, Woodlake, CA 93286
Contact: Susan Ortega, Program Director
Phone: (559) 564-3412
Fax: (559) 564-3954
susano@woodlake.k12.ca.us

2 Expeditionary Learning Outward Bound (ELOB)

A NATIONAL COMPREHENSIVE SCHOOL REFORM MODEL

Sometimes, the direst needs require that extraordinary measures be taken. The King Middle School in Maine fell squarely into this "dire need" category in 1993 when it started its program in environmental education. The State Education and Environment Roundtable (SEER), a national group that evaluates environment-based education, has studied over one hundred schools across America that have made a strong commitment to the environment in their educational programming. It finds that these schools often arrived at the use of the environment as a tool for reform after reaching their own measure of dire need. Here is how King School handled the pressure.

Before adopting the Expeditionary Learning Outward Bound (ELOB) model for Comprehensive School Reform in 1993, Helen M. King Middle School in Portland, Maine struggled with rampant discipline problems, poor attendance, negative attitudes, non-existent parental participation, and low academic performance. Nearly 10% of the student body transferred to other area schools in just three years. At the same time, the Limited English Proficient (LEP) and bilingual population of the school rocketed to 22%. In a school where 70% of the students already qualified for federally subsidized lunch, teachers found their students increasingly struggling with academics due to a wide variety of socio-economic disadvantages.

Instead of despairing, Principal Mike McCarthy and his team of teachers eliminated tracking and embarked on ELOB, a program of Comprehensive School Reform through environmental education. Through a commitment to experiential learning, ELOB promotes character development, social and environmental responsibility, compassion, literacy, teamwork, and service. In practical terms, ELOB consists of "learning expeditions," or units of focus that culminate in projects showcased for the school as well as the community.

King's recent learning expeditions have incorporated several environmental themes. In the Rock the House Geology expedition and Weathering the Storm, students used their skills in science, technology, social studies, and language arts to explore how geology and weather affect their lives. Both expeditions focused on the local environment, and the Storm expedition culminated in an exhibit on "Famous Storms of Maine and New England." Other recent expeditions have explored non-point source, or run-off water pollution and "Yuckology," an aptly named study of bacteria, viruses, diseases, and immunity.

Despite steady increases in King's low-income and LEP populations over the years, the standardized test results have shown marked improvements in all disciplines, including writing. Since the implementation of ELOB in 1993:

- The very first ELOB team at King achieved instant results — 50% fewer discipline problems and improved attendance, student engagement, and academic achievement.

- King's scores on the District-Wide Middle School Writing Assessment have improved.
- King's performance on the Maine Educational Assessment (MEA) has consistently improved in all areas — reading, writing, math, science, health, social studies, and arts and humanities.
- When compared to other schools in Portland and in the state of Maine as a whole, King had the highest percentage of students who ranked in the "exceeds standards" category of the 1998-99 MEA exam.
- ELOB has been especially beneficial to King's large population of LEP students, who perform almost as well as their monolingual peers on the MEA.
- Teacher participation in summer professional development skyrocketed from four teachers to 75% of all teachers at King.
- Parental involvement in the school community rose from 1% to 27%.
- Between 1997 and 1999, 21 students left private schools in order to attend King

Expeditionary Learning Outward Bound (ELOB)
100 Mystery Point Road, Garrison, NY 10524
Contact: Linda Collins, Outward Bound U.S.A.
Phone: (845) 424-4000
Fax: (845) 424-4280
linda_collins@elob.org
http://www.elob.org/

School of Environmental Studies ("Zoo School")

3

WINNER OF THE NEW AMERICAN HIGH SCHOOLS AWARD

A promising convergence of the educational and environmental fields exists in the evolution of zoo programming in America. In recent years, zoos have come to recognize they are much more than places for the public to view wild animals. Many have recast their missions to feature public education. A shining example of how effective this melding of interests can be is found in Minnesota at the School of Environmental Studies.

The School of Environmental Studies ("Zoo School") enables 400 high school juniors and seniors in the Rosemount/AppleValley/Eagan School District to pursue their high school studies through an innovative environmental education program. Opened in 1995, the school facility sits on the grounds of the Minnesota Zoo, which functions as a learning laboratory along with the nearby 3000-acre Lebanon Hills Regional Park.

At Zoo School, students gain the ability to draw connections between disciplines by pursuing a curriculum unified by the environmental theme. As Principal Dan Bodette explains, "Kids make connections across disciplines [which] allows students to do the kind of thinking that problem solving in the real world requires." Each student spends three hours a day engaged in Thematic Studies, a seamless integration of language, social studies, and environmental science classes. For instance, one thematic study might focus on the human-water relationship, incorporating literature about water, studies of water's role in world civilization, and technical reports on local ponds.

In addition to recognizing the connections between disciplines, students learn to apply their interdisciplinary understanding to the world around them. For ten days during each trimester, Zoo School suspends classes so that the students can pursue their own independent study on a topic of their choice. During this time, they may choose to engage in Field Studies at Zoo School or elsewhere, which often incorporate a strong service-learning component. Projects can include anything from designing a web page for the Jane Goodall Institute's Roots and Shoots program, teaching local fourth graders about ecosystems, or building a trail around Birch Pond.

When coupled with Zoo School's strong internship program, community mentoring program, and faculty advising, Zoo School's integrated curriculum has valuable benefits:

- In all academic areas, Zoo School's students score higher on the ACT test for college admission than their peers in the district, the state, and the nation.
- Zoo School students graduate with skills that they will need for success in college: the facility to make connections and the capacity to work independently.
- Zoo School's approach creates active citizen leaders who are environmentally informed and community-oriented life-long learners.

School of Environmental Studies ("Zoo School")

12155 Johnny Cake Ridge Road, Apple Valley, MN 55124
Contact: Dan Bodette, Principal
Phone: (952) 431-8750 ext. 8751
Fax: (952) 431-8755
dan.bodette@district196.org
http://www.district196.org

Gililland Elementary School

4

PROJECT-BASED LEARNING

Most educators recognize that students will get very excited and motivated by a hands-on project. Few, however, may grasp the depth of lasting learning that such a project can produce in students. The educational experiences of investigation and research, crossing disciplines, working in teams, applying knowledge and more are readily provided when students take on a significant project. For the Gililland School in Texas, that means restoring a patch of native prairie along with helping to improve some young lives.

Gililland Elementary School has achieved nationwide recognition for the "Prairie Project," a demonstration of the natural compatibility of environmental education and project-based learning. When a local manufacturing plant sought to restore its unofficial dumping ground to its native beauty, Gililland School had found its outdoor classroom. The former and future prairie encompasses 28 acres and a creek.

As the students progress towards full restoration of the native prairie, they learn important lessons along the way. In the past eleven years, the students have constructed a greenhouse in which to cultivate native prairie plants. Many have become self-made experts on their bioregion's social and ecological history, planted trees and an herb garden, built a foot bridge, and even published literary research on the legends of prairie flowers. Classes have also engaged in the traditional prairie art of quilt-making. In addition to learning to measure perimeters and sew, former students cite the quilting classes as how they also learned to iron their clothes.

Gililland students help write applications for grants to support their own learning projects. In 2000 and 2001, the students' hard work paid off when they won a $10,000 Service Learning Grant for use in on-site projects including the construction of a creek in the school courtyard. For the past four years, Gililland has also been awarded Campus Learn and Serve Grants.

Eleven years after its start, the Prairie Project continues to inspire and instruct Gililland's students in subjects ranging from literature to history to botany. Certain teachers at Gililland have abandoned textbooks altogether in favor of the integrated project-based curriculum offered by the prairie, and standardized test scores have only improved as a result.

Indeed, the Prairie Project has garnered praise and recognition from many quarters:

- Over 85% of Gililland students passed all sections of the Texas Assessment of Academic Skills (TAAS). This is above the state average.

- Gililland graduates show a sustained interest in science.
- Texas Monthly magazine rated Gililland a four-star school based on student achievement.
- The Texas Education Agency named Gililland a "Title I Commended School."
- Members of the community ranging from Lady Bird Johnson to Jane Goodall have commended the project's success.

Gililland Elementary School
701 Waggoman, Fort Worth TX 76131
Contact: Jane Weaver
Phone: (817)232-0331
Fax: (817) 232-8822
janesclass@rocketmail.com
http://myschoolonline.com/site/0,1876,48033-138365-51-37658,00.html
http://www.tpwd.state.tx.us/expltx/p&l/gilelem/
http://www.seedsource.com/educate/classroom.htm
http://www.emsisd.com/Gililland.htm

5 San Diego Natural History Museum

AFTER SCHOOL SCIENCE ADVENTURES

Surely the growth and development of after-school educational programming is one of the most intriguing phenomena in recent educational history. Working together, schools and community organizations help students build academic, social and community skills, provide opportunities for recreation and enrichment, and keep them from harm's way. Environmental education in the after-school setting is an exciting prospect for many. In San Diego, the Natural History Museum has evolved the relationship to an even more exciting reality.

After-school Science Adventures enables inner-city children in grades one through four from ethnically diverse City Heights to experience the environment through informal, interactive, hands-on educational activities. The program aims to improve the academic achievement of its participants while promoting understanding of the environment and inspiring attitudes of respect and responsibility towards it.

The program, which is funded by the James Irvine Foundation's Museum Youth Initiative, arose from a collaboration between the San Diego Natural History Museum, the City of San Diego's "6 to 6" Extended School Day Program, the San Diego Social Advocates for Youth, and Rosa Parks Elementary School. The Museum provides the *After-school Science Adventures* program for Rosa Parks Elementary School students who are enrolled in the City of San Diego's "6 to 6" Extended School Day Program. Social Advocates for Youth provides child-care on the Rosa Parks site, and the museum offers its tremendous resources to provide an extraordinary after-school experience for the students.

The *After-school Science Adventures* curriculum, which correlates with California state science standards, takes an interdisciplinary approach to science and strives to endow students with a sense of place and engagement in the community. The first and second grade curriculum includes month-long thematic units on topics such as dinosaurs, geology, and a sense of place. Third and fourth graders study ecosystems, nutrition, the community, and other topics while working to enhance skills in writing, analytical thinking, reasoning by analogy, mapping, and drawing. *After-school Science Adventures* also introduces students to the National Wildlife Federation's School Yard Habitat Program, which enables them to become familiar with neighborhood resources and to plant a garden.

After-school Science Adventures strives to involve families and communities in the students' educational experience. All students enjoy monthly field-trips that bring their classroom activities to life and provide experiences outside of their community. Three times a year, families are invited to accompany their children on fieldtrips to the San Diego Natural History Museum. To keep parents abreast of

the students' activities, the museum also produces a newsletter and holds tri-annual open houses showcasing the students' work.

The program continues to expand each year, providing more and more students with constructive and educational activities to fill the critical hours immediately after school. A model of the synergy that can result from partnerships between community-based organizations, local government, schools, and museums, *After-school Science Adventures* delivers the resources of a world-class museum directly to the community in one of the nation's premiere after-school environmental education programs.

After School Science Adventures at the San Diego Natural History Museum

Mailing Address: P.O. Box 121390
San Diego, CA 92112-1390, USA
Street Address: 1788 El Prado, San Diego, CA 92101
Contact: Judy Ramírez
Phone: (619) 987-3548
Fax: (619) 934-8633 or (760) 765-0156
jramirez@sdnhm.org
http://www.sdnhm.org/education/community/scienceadv.html

6 Huntingdon Area Middle School

PROJECT-BASED LEARNING AND SERVICE LEARNING

Many schools, especially middle schools, now require some level of community service as part of the educational experience. No one would be particularly surprised to learn that environmental projects are a leading subject for such community service projects nationwide. Some schools, however, transform community service into full-blown environment-based service learning programs. The Huntingdon School in Pennsylvania made this leap in 1991 and has prospered since.

Ever since Huntingdon Area Middle School adopted Science Teams in Rural Environments for Aquatic Management Studies (STREAMS) in 1991, the unquenchable student thirst for learning has necessitated expansion of the program. While the idea for the STREAMS project originated in study hall, the environmentally based curriculum has evolved into a 60-hour plus core program taught to all sixth-graders. The curriculum integrates environmental topics into hands-on learning projects in social studies, science, math, and language arts. The teachers in these four subject areas work as a team to endow the students with the skills they need to undertake complex environmental projects. After completion of this core course, many students choose to participate in a rigorous after-school environmental education program that takes place during study hall, after-school, and on weekends.

In a county where fewer than 10% of adults have post-secondary degrees, the success of Huntingdon's voluntary, not-for-credit after-school program appears to be reversing some deeply entrenched local attitudes about education. The after-school club, which averages over 60 members a year, performs environmental activities to benefit the community. The students fund all of their activities by writing and obtaining their own grants. While teachers are always available for assistance, the students design and carry out the projects on their own.

The students at Huntingdon have become local experts in community stewardship, receiving grants of up to $250,000 to accomplish projects such as assessing watersheds, repairing broken sewage lines, constructing wetlands, and restoring stream banks. When asked why they participate in a not-for-credit after-school program, they cite the sense of empowerment and satisfaction that they derive from helping their local community. Students become both "learners and leaders" by educating people about environmental planning and protection. For example, when students found high levels of bacteria in a local stream, the county government began to address the problem of storm water runoff. Students have presented their research

to government authorities, local service clubs, the press, teachers, and other community members.

STREAMS has increased student comprehension, retention, and assimilation of concepts while decreasing discipline problems and providing numerous other benefits:

- Students with different learning styles have met with unprecedented academic success.
- The high number of Huntingdon students who elect to undertake independent environmental projects after school and on weekends attests to their passion for learning.
- Parents have become enthusiastic about volunteering to chaperone, transport, and otherwise aid the students in their after-school activities.
- Students have formed community partnerships with organizations including the Pennsylvania League of Women Voters, Juniata College, the Huntingdon County Conservation District, the Juniata Clean Water Partnership, the Muddy Run Advisory Committee of the Huntingdon Borough Council, the Pennsylvania Association of Conservation Districts, and the Pennsylvania Department of Environmental Protection.
- In 2001, the U.S. EPA selected Huntingdon's Standing Stone Creek Watershed Assessment project as the Region 3 winner in the President's Environmental Youth Award Competition.

Huntingdon Area Middle School

2500 Cassady Avenue
Huntingdon, PA 16652-2699
Contact: Fred Wilson
Phone: (814) 643-2900
Fax: (814) 643-6513f
wilson@dns.tiu.k12.pa.us http://www.hasd.tiu.k12.pa.us
www.ems.psu.edu/HAMS/ (STREAMS Curriculum)

7 Dowdell Middle Magnet School

EE AND SERVICE LEARNING

There are thousands of magnet schools in the United States. In recent years a number have shifted toward using environmental education as an organizing strategy. The Dowdell School in Florida builds on the study of native wildlife as a tool for addressing the academic needs of its students, encouraging community service and securing higher levels of parent involvement.

Dowdell Middle Magnet School offers a comprehensive environmental studies curriculum with numerous opportunities for service-learning. Dowdell Magnet comprises a diverse student population, with near equal numbers of African-American, Hispanic, and Caucasian students. A full 64.5% of students qualify for free or reduced-price lunches.

Along with environmental education, service-learning forms a central ingredient of the curriculum and the daily experiences of Dowdell's motivated and successful student body. A toad house project, undertaken under the auspices of Earth Force, exemplifies the sophistication of Dowdell's service-learning projects.

The toad house project began when Dowdell students expressed an interest in providing habitat for native Floridian animals. The students received a $400 grant from Home Depot to support the construction of 300 toad houses. Employing inexpensive and readily available clay pots, they constructed, painted, and numbered the 300 toad houses. The students then distributed the toad houses to members of the community who placed them in the local environment. In order to aid people in appropriately placing the houses, the students created an educational brochure describing different species of local toads and their preferred habitats. These houses provide shelter and habitat for native Floridian toads and frogs, thereby aiding in their survival.

During their field trip to Lowry Park Zoo, the Dowdell students researched native Floridian wildlife, with a special emphasis on frogs and toads.

The process of observing and monitoring the numbered toad houses allowed the students to map the distribution of different species of frogs, toads, and other native wildlife in the area. The students developed important academic skills, strengthened community ties, and benefited a native species all in the context of a single project.

Environmental education and service-learning have proven a winning combination for Dowdell. During a recent survey, the Dowdell community expressed an abundance of positive feedback:

- Students feel that obeying the rules is important.
- Students feel good about the extracurricular program, which includes an ecology club.
- Faculty members feel that professional development is important.
- Faculty members feel that the school considers parents as full stakeholders.
- Parents feel comfortable visiting Dowdell Middle Magnet School.
- Parents feel that teachers treat their children with respect and are courteous and helpful.
- Students scored better than the state mean and national median on the reading and math sections of the Florida Comprehensive Assessment Test (FCAT).

Dowdell Middle Magnet School
1208 Wishing Well Way, Tampa FL 33619
Contact: Robert Lawson, Principal
Phone: (813) 744-8322
robert.lawson@sdhc.k12.fl.us
http://www.sdhc.k12.fl.us/~dowdell.middle/

Four Corners School of Outdoor Education

8

CANYON COUNTY YOUTH CORPS: SERVICE LEARNING

The Four Corners region of the Colorado Plateau embodies a unique mix of cultures, landscapes and educational traditions. Standard classroom-oriented approaches that might place the larger educational experience in distinct and dry categories work less well in this region. Environmental studies and hands on learning programs such as those of the Four Corners School of Outdoor Education in Utah handle this innate complexity with elegance and practical benefit to the student, demonstrating how environmental education can regionalize or localize educational programming in very useful and important ways.

The Four Corners School of Outdoor Education administers several unique environmental education programs for people across the nation and particularly for the residents of the Colorado Plateau. Among these programs is the Canyon Country Youth Corps (C.C.Y.C.), which consists of spring, summer, and fall work programs and an academic-year service-learning program for youth between the ages of 16 and 23. In recent years, approximately 90% of the participants have been Navajo.

During the season, the C.C.Y.C. crew undertakes public lands' restoration projects while learning job skills, life skills, environmental stewardship, and a school-district approved science curriculum. The school-year program encompasses after-school and weekend activities such as service-learning camping trips. C.C.Y.C. participants learn about the environmental impact of overgrazing and mining on the Colorado Plateau, and they gain the knowledge and skills to address the situation in positive and effective ways. C.C.Y.C. crew members also receive high school or college academic credit for their participation.

The Four Corners School is located in one of the most distinctive and intricate landscapes in the world, the Colorado Plateau. On the Plateau, erosion has left a legacy of arches, alcoves, spires, canyons, domes, and towers carved in pink, purple, and red stone. Geological time has left its mark quite clearly in the numerous fossils, dinosaur bones, and layers of sedimentary rock. Six of the seven North American life zones are represented on the Plateau, and animals and plants abound. When

coupled with the rich native cultures of the Navajo, Pueblo, and Ute tribes, the environment on the Colorado Plateau provides nearly inexhaustible and irreplaceable resources for personal growth, wonder, and environmental education.

Since its founding in 1984, the Four Corners School of Outdoor Education has made significant strides towards its goal of protecting and preserving the natural and cultural heritage of the Colorado Plateau, the Southwest, and the planet through education and outreach. C.C.Y.C. has been a significant factor in achieving this success:

- Since its inception, 25,000 participants between the ages of 6 and 90 have taken part in the school's outdoor education programs for youth, adults, and teachers.
- Participants in the school's programs have performed over 35,000 hours of youth and adult service on public lands.
- Participants have repaired hundreds of miles of trails and roads on public lands.
- The school has worked to protect over 20 archaeological sites on public lands.
- 200 teachers have won scholarships from the school.
- Since 1992 alone, the school has garnered awards from the North American Association for Environmental Education, National Public Radio, the 2002 Winter Olympics Committee, the governor of Utah, the Coleman Company, the Utah Society for Environmental Education, the Utah Wildlife Society, the National Wildlife Federation, and the U.S. Forest Service.

Four Corners School of Outdoor Education
P.O. Box 1029, Monticello UT 84535
Contact: Lee-Ann Hill
Phone: (435) 587-2156 or (800) 525-4456
Fax: (435) 587-2193
lhill@fourcornersschool.org
http://www.4corners.net/ccyc/

Eagle Rock School

9

EE AND AT-RISK YOUTH

Even the most sophisticated of education experts will sometimes make the faulty assumption that environmental education is mostly for the well off. But environmental education is not a "rich kids" pastime. It has real meaning for rural and inner city youth as well. Recent study and experience show that environment-based programs can work wonders for at-risk youth who immediately take to its relevance and the sense of responsibility it can instill. The Eagle Rock School in Colorado demonstrates this effect.

The American Honda Education Corporation founded the Eagle Rock School in 1993 as a haven for high-school students who struggle in traditional academic settings. Some of these students suffer from problem relationships at home; most have dropped out, been expelled, or given up on completing high school; some have made poor decisions regarding drugs, alcohol, and gangs; and many exhibit low self-esteem. Eagle Rock School invites such students to apply for admission to their tuition-free, year-round boarding school, which is nestled in a secluded valley near Estes Park. Eagle Rock School accommodates approximately 100 students in its six student houses.

The school's mountain setting provides the heart of an innovative curriculum that incorporates both service and the environment into subjects such as math, art, philosophy, and social studies. Both environmental science and service are part of the school's code. Service-based academics, which are linked to Colorado's content standards, help to transform once unsuccessful and at-risk youth into academically successful students and engaged citizens.

Service-learning projects allow the students to address problems in the community while learning about topics that interest them. The Eagle Rock experience begins with a wilderness trip that

includes a weeklong service project as well as education about the local environment.

The curricular commitment to service continues when formal classes begin. For instance, in "Touch the Future," students become counselors and instructors for inner-city third and fourth graders who have no experience in the Eagle Rock mountain environment. Eagle Rock students teach the younger students about the ecology of their home regions and the mountains through adventure games and other activities. In another course, "Eagle Rock Press," Eagle Rock students to have the opportunity to research, write, illustrate, laminate, and bind books on environmental science to fill in gaps in a local elementary school library. "Rock 'n' Road" teaches students about geology, mathematics, and literature as they rock climb and perform service on trails.

Many service-learning projects take place in nearby Rocky Mountain National Park, where students have recently studied invasive species and worked to remove them through direct eradication and public education. After completing their projects, students often have the opportunity to reflect on what they have learned by writing about their experiences in a portfolio.

At Eagle Rock School, service-based environmental education enables formerly unsuccessful students to achieve academic and personal success by graduating from high school. In addition:

- Students gain a sense of purpose and self-esteem by doing meaningful work.
- Students learn that they can make a difference, and they are empowered by this knowledge.
- Students feel engaged in their community rather than antagonistic towards it.
- Students become more interested in school.
- Service-learning creates a lasting commitment among students to improve the quality of life for others and contribute to their communities.

Eagle Rock School
P.O. Box 1770, Estes Park CO 80517
Contact: Robert Burkhardt, Head of School
Phone: (970) 586-0600
Fax: (970) 586-4805
rjbers@aol.com
http://www.eaglerockschool.org

10

Skykomish High School

EE, THE ARTS AND COMMUNICATIONS

Sometimes learning about an environmental problem causes students to move beyond study to actually address the issue. Students at the Skykomish School in Washington used film as their way to have a voice on a local environmental problem and help foster remedial steps toward a solution. Along the way they needed to learn the science, art, language skills and some basic civics. Importantly, they learned how effective they could be as people with a concern.

Skykomish High School is located in a small town with a big problem. Since the early 1900s, Skykomish, Washington has rested on an underground lake of 160,000 gallons of oil, which has been noticeably seeping into the Skykomish River since at least the 1920s. In the 1970s, the Burlington Northern Railroad discontinued most fuel handling activities at its Skykomish facility. As a result, the railroad decided to unearth a massive fuel tank only to discover that its bottom had long since disintegrated, releasing the carcinogenic contents of the tank into the groundwater and the river, which is a breeding ground for endangered species.

In 2000, Skykomish High School's Speech and Communications class began to film "An Oily Sky," a documentary about the oil spill and its history and hazards to the community. With funding from the King County Solid Waste Division's RecycleArtist Program, equipment and support from the 911 Media

Arts Center in Seattle, and lessons from filmmaker Malory Graham, the six students used film to voice their concerns about an issue of great importance in their lives. They had no idea that they would catalyze tangible change in their community. As one student observed, "We were up against Burlington Northern Santa Fe Railroad, which is like a huge company, and they have tons of money. So we were like, 'Oh, they're probably not going to do anything.' But they're actually cleaning up right now."

The film focused nationwide attention on the issue and garnered a host of awards, including an award from the Northwest Film Center's Young People's Film and Video Festival, the Earth Heroes Award, and the Brower Award, one of the nation's most prestigious recognitions for young environmental activists. The film received rave reviews from audiences of professional filmmakers at various film festivals. "An Oily Sky" also won the EPA-sponsored President's Environmental Youth Award for Region 10, which called for the students' presence at a ceremony in the White House Rose Garden hosted by the President and EPA Administrator Christie Todd Whitman. For many of the Skykomish students, the trip to Washington, DC to attend the awards ceremony was the occasion of their first-ever trip on an airplane. Men's Warehouse donated suits for the three boys.

At the time that the students made the documentary, only 700 of 160,000 gallons of spilled oil had been recovered. Since the making of "An Oily Sky," the railroad has redoubled its efforts to clean up the spill, even building a barrier wall to prevent further seepage into the Skykomish River. By winter 2002, the Washington State Department of Ecology plans to have completed their site assessment, and a clean-up plan should be proposed shortly thereafter.

In the small town of Skykomish, a dynamic blend of the arts and environmental education has enabled a high school with fewer than 30 students to have an impact far exceeding its numbers. Despite these efforts, the river is still flanked by signs warning against touching the oil-filled waters, which eventually flow into Puget Sound and the Pacific Ocean. However, the fact remains that after a century of inaction, the Washington State Department of Ecology is working with the railroad to devise the best strategy to clean up the oil spill that has been poisoning the river, the soil, and the inhabitants of Skykomish for decades.

Skykomish High School

P.O. Box 325
105 6th Street
Skykomish WA 98288
Contact: Don Emerson
Phone: (360) 677-2324
Fax: (360) 677-2418

RESOURCES "AT A GLANCE"

National Programs

Listed are eight popular K-12 programs that are available nationally. All of these programs use environmental education to boost both student achievement and responsible decision-making skills. These represent a small sampling of the wide array of national, state, and local programs available.

Adopt-A-Watershed

http://www.adopt-a-watershed.org/
P.O. Box 1850, Hayfork, CA 96041, (530) 628-5334

Adopt-A-Watershed, a K-12 school-community learning experience, uses a local watershed as a living laboratory. Through hands-on activities and service-learning, Adopt-A-Watershed aims to enhance K-12 science education and encourage watershed stewardship. In addition to providing many educational links related to watersheds, their website includes information about their philosophy, available curricular materials and services, and upcoming events.

Earth Force GREEN

http://www.green.org/
1908 Mount Vernon Avenue, 2nd Floor,
Alexandria, VA 22301, (703) 299-9400
green@earthforce.org

The Global Rivers Environmental Education Network (GREEN), an award-winning program for middle and high school youth, imparts critical academic skills while educating students to improve watersheds in their communities. GREEN's website provides the necessary tools: water monitoring equipment, resource and action guides, web space to post results, and other national and local resources.

GLOBE Office

http://www.globe.gov/
1800 G Street NW, Suite 800
Washington, DC 20006, (202) 501-3200

GLOBE trains teachers to help students improve their achievement in science, math, and computer literacy by taking scientifically valid measurements in the fields of atmosphere, hydrology, soils, and land cover/phenology and reporting their data through the Internet to the student data archive. By creating partnerships between students and professional scientists, GLOBE increases student awareness of the environment from a scientific viewpoint. GLOBE's extensive website multiple resources for teachers and students as well as news, a FAQ list, links, evaluations of the program, and more.

National Wildlife Federation's Environmental Education Programs

http://www.nwf.org/education/
1400 16th Street NW, Washington, DC 20036,
(202) 797-6800

The National Wildlife Federation offers several environmental education programs tailored to both communities and schools. For example, the Schoolyard Habitats Program focuses specifically on assisting school communities in using school grounds as learning sites for wildlife conservation and cross-curricular learning. This site provides detailed information about EE programs including Schoolyard Habitats, Earthsavers, and more.

Project Learning Tree (American Forest Foundation)

http://www.plt.org/
1111 19th Street NW, Suite 780,
Washington, DC, 20036, (202) 463-2462

This acclaimed interdisciplinary K-12 EE program promotes knowledge of the natural and built environment and the human role in preserving it. PLT activities, many of which are available in both Spanish and English, correlate to national standards for science, social studies, language arts, and math, while topics range from forests, wildlife, and water, to community planning, waste management and energy. The website includes materials for teachers and informal educators, news, evaluations, and other information.

Project WET (Montana State University)

http://www.montana.edu/wwwwet/
Project WET, 201 Culbertson Hall, Montana State University, Bozeman, MT 59717, (406) 994-5392

Project WET (Water Education for Teachers) fosters knowledge and stewardship of water resources while helping students meet academic standards, such as the Benchmarks for Science Literacy. The website contains information on the program's goals, history, correlation to curriculum standards, and more.

Project WILD (Council for Environmental Education)

http://www.projectwild.org/
Project WILD National Office, 5555 Morningside Drive, Suite 212, Houston, TX 77005, (713) 520-1936
info@projectwild.org

Project WILD, an interdisciplinary K-12 environmental education program, focuses on wildlife as a means of engaging student interest in learning and academic achievement. The website includes materials and guidebooks correlated to the National Science Education Content Standards, program information and evaluations, a database of Project WILD schools, and more.

Windows on the Wild, Biodiversity Basics (World Wildlife Fund)

http://www.worldwildlife.org/windows/
1250 24th Street NW, Washington, DC 20037, (800) 225-5993

Windows on the Wild, or WOW, uses biodiversity as a "window" through which to view complex scientific, social, political, cultural, and economic issues. WOW simultaneously provides quality environmental education and demonstrates the interconnectedness of all life on Earth. The website includes extensive teacher guides, classroom activities, professional development resources, as well as a wealth of information related to biodiversity.

Environmental Education Organizations and Projects

Association for Supervision and Curriculum DEvelopment (ASCD) Environmental Education Network

Bora Simmons, Dept. of Teaching and Learning, Northern Illinois University, DeKalb, IL 60115 (815) 753-8594, boras@niu.edu

An ASCD "network" is a group of people united by a common purpose, interested in a particular issue, or seeking similar information. Groups are welcome to join the EE Network, which supports and promotes EE, without being members of ASCD, provided that at least 50% of the individuals are members. For more information about ASCD networks, please visit http://www.ascd.org/aboutascd/cr/networks/aboutnet.html.

North American Association for Environmental Education (NAAEE)

http://naaee.org/
410 Tarvin Road, Rock Spring, GA 30739, (706) 764-2926, email@naaee.org

NAAEE, an association of EE educators, students, and volunteers, offers a variety of programs and activities to support EE worldwide. Their website includes a list of environmental education standards, called the materials and learning guidelines. It also incorporates EE resources, projects, and news as well as more detailed information about their association.

Environmental Education and Training Partnership (EETAP)

http://eetap.org/
EETAP, College of Natural Resources, University of Wisconsin, Stevens Point, WI 54481, (715) 346-4958

EETAP, the national training program of the U.S. Environmental Protection Agency's (EPA) Office of Environmental Education, supports classroom teachers as well educators working for nature centers, museums, and government agencies. Information about a wide range of programs, services, and resources can be found on their website.

National Environmental Education Advancement Project (NEEAP)

http://www.uwsp.edu/cnr/neeap/
NEEAP, College of Natural Resources, UWSP, Stevens Point, WI 54481, (715) 346-4748

NEEAP, a member of EETAP, focuses on building national, state, and local capacity for environmental education. Their website contains further information on their strategy and goals as well as a seasonal newsletter.

National Environmental Education & Training Foundation (NEETF)

http://www.neetf.org/
1707 H Street NW, Suite 900,
Washington, DC 20006-3915, (202) 833-2933

NEETF strives to build a stronger economic, societal, and ecological future through environmental learning. The Foundation focuses on EE's potential to strengthen and improve education, health, and business, especially in disadvantaged communities. NEETF's website includes detailed information on its various programs as well as links to several of its publications.

US EPA, Office of Environmental Education

http://www.epa.gov/enviroed/
1200 Pennsylvania Avenue, N.W. (1704A),
Washington, DC 20460, (202) 564-0443

The Environmental Protection Agency's Office of Environmental Education promotes EE efforts by linking EE to educational reform, supporting EE capacity building, researching and improving EE programs, and keeping the public informed of their activities. The Office strives to improve academic achievement while fostering responsible and informed environmental decision-making.

Bibliography

Closing the Achievement Gap: Using the Environment as an Integrating Context for Learning

http://www.seer.org/pages/GAP.html
Lieberman, G.A., and L. L. Hoody.
San Diego, CA: State Education and Environmental Roundtable, 1998.

When the environment is used as an integrating context for learning, student achievement improves. This qualitative study of 40 schools provides the results of surveys, interviews, observations, and achievement tests to demonstrate how, why, and to what degree. As mentioned above, the State Education and Environment Roundtable (SEER) has developed a comprehensive school reform model that is being used in many states across the country. For more information, please go to SEER's home page.

EEducator: Advancing Education Reform

http://naaee.org/publications/pubdescriptions.php
North American Association for Environmental Education (NAAEE), Spring 1999.

This collection of articles examines how EE can be used to advance student learning. It covers topics including instruction, professional development, assessment, and standards.

EE: Moving into the Education Mainstream, Issue 26

http://www.ascd.org/readingroom/infobrief/issue26.html
Association for Supervision and Curriculum Development, August 2001.

This publication explores how environmental education can be linked to current movements in education to improve student achievement.

Environment-based Education: Creating High Performance Schools and Students

http://www.neetf.org/pubs/NEETF8400.pdf
Washington, DC: The National Environmental Education & Training Foundation, 2000.

This report contains case studies of schools and programs that have adopted EE as their curricular focus.

Environmental Education: A Resource Handbook

http://www.pdkintl.org/
Heimlich, Joe E. Bloomington, Indiana: Phi Delta Kappa International, 2002.

This collection of articles explores major issue areas in EE, including the question of integrating EE and formal education. It includes listings of resources available through the ERIC Clearinghouse for Science, Mathematics, and EE and the Eisenhower Clearinghouse.

Environmental Education in the United States — Past, Present, and Future

http://www.naaee.org/html/pubdescrips.htm
Archie, Michele, ed. Burlingame: Collected Papers of the 1996 National EE Summit, 1998.

This collection of discussion papers includes a thorough analysis of many important issues in EE.

Environmental Problem Solving: Theory, Practice and Possibilities in Environmental Education

http://www.naaee.org/html/pubdescrips.htm
Editors Bardwell, Monroe, and Tudor. NAAEE, 1994.

This clearly written book unites problem-solving theory with its practice in EE.

Evaluating Environmental Education

http://www.iucn.org/cec/documents/ACF8044.pdf
Stokking, K., van Aert, L., Meijberg, W., and A. Kaskens. Trans. Rosemary Martin. IUCN - The World Conservation Union, Gland, Switzerland, 1999.

This book describes a formal evaluation process for environmental education programs.

Molokai: An Investment in Children, the Community, and the Environment

Cheak, M., Volk, T., and H. Hungerford. Carbondale, IL: The Center for Instruction, Staff Development and Evaluation, 2002.

Report Assessing Environmental Education in the United States and the Implementation of the National Environmental Education Act of 1990

National Environmental Education Advisory Council. Washington, DC: U. S. Environmental Protection Agency, 1996.

This report, prepared for Congress, provides an overview of the need for EE, the status of EE in the United States, and recommendations for action.

Using Environment-based Education to Advance Learning Skills and Character Development

http://www.neetf.org/pubs/EnviroEdReport.pdf
Washington, DC: The National Environmental Education and Training Foundation, 2001.

This report describes the efficacy of EE in helping young people become lifelong learners and leaders.

Web Resources

EE-Link

www.eelink.net

EE-Link, a project of NAAEE, develops and collects quality EE materials and makes them available to a broad audience of teachers and other educators. It uses only fact-based, accurate resources that inspire inquiry, critical thinking and decision-making, and engagement.

ERIC Clearinghouse for Science, Mathematics, and Environmental Education

www.ericse.org/eeindex.html

The Educational Resources Information Center (ERIC) is a federally supported system of 16 education clearinghouses. This site enables the user to search a database that describes nearly one million articles, reports, curriculum guides, books, and other information resources.

GreenCOM

http://greencom.aed.org/dbtw-wpd/gcom.htm

The GreenCOM Resource Center contains a searchable collection of over 3,000 different classroom materials, each of which is carefully screened for quality and excellence.

U.S. Environmental Protection Agency (EPA)'s Office of Environmental Education

http://www.epa.gov/enviroed/resources.html
http://www.epa.gov/enviroed/teachers
http://www.epa.gov/enviroed/otherepa2.html
http://www.epa.gov/enviroed/ftfee.html

This site offers a wide array of EE information developed and/or funded by the EPA. It also includes a search engine of EE materials sorted by environmental topic.

National Environmental Education & Training Foundation

1707 H Street, NW, Suite 900
Washington, DC 20006
Tel: 202-261-6477
Fax: 202-261-6464
Email: neetf@neetf.org
Website: http://www.neetf.org